



3421

C. & G. SURVEY,
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Diag. Chart No. 8552

Department of Commerce and Labor
COAST AND GEODETIC SURVEY

Superintendent.

State: *Alaska*

DESCRIPTIVE REPORT.

Hyd. Sheet No. *3421*

LOCALITY:

South Coast of Alaska
Aialik Bay

1912

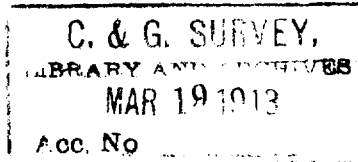
CHIEF OF PARTY:

S. J. Gilliam

11-4645

3421

3421



DEPARTMENT OF COMMERCE AND LABOR

COAST AND GEODETIC SURVEY

O. H. Tittmann, Superintendent

Descriptive Report

to accompany

Hydrographic Sheet #

Aialik Bay, Kenai Peninsula

Alaska.

Steamer McArthur

C. G. Quillian, Assistant,

Commanding.

Hydrography by

S. A. Graham, Aid

in charge

and

H. Leypoldt, Aid.

Executed July-September

1912.

3421

U.S. Coast & Geodetic Survey

O.H. Tittmann Superintendent

HYDROGRAPHY
of

ALALIK BAY, ALASKA

C. & G. SURVEY,
LIBRARY AND ARCHIVES
MAR 18 1913
Acc. No

From Chiswell Is. to Slushy Bay.

by the

Party in Charge of C.G. Quillian, Asst. C. & G.S.

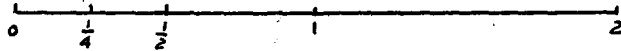
Steamer W.P. McArthur

Began- June 19 , 1912

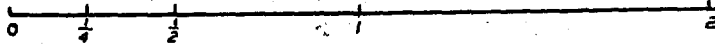
Ended- Sept. 22 , 1912

Scale- 1 to 40 000

Statute Miles



Nautical Miles



Launch Delta in charge of S.A. Graham, Aid & H. Bernhardt, Mate
Left Angle and Recorder, H. Leypoldt, Aid
Coxswain, H. T. Martin, M. at A.

Automatic Tide Gauge #82 at Camp Cove, Alaska
" " " #92 at Seward, Alaska

Descriptive report to accompany hydrographic sheet No.

Aialik Bay, Alaska.

Scale; 1 to 40,000

(a) General description.

Aialik Bay is about 20 miles long, running practically in a north and south direction, from Chiswell Islands to its head. The coast is high and rugged, with numerous glaciers showing in the valleys and in the heads of coves. There are many high and prominent headlands and the bay is of very irregular shape with a cut up shore line, forming numerous small coves and bights. The depths are great throughout and there are no dangers in the usual mid-channel track of vessels. A sand bar extends entirely across the bay, about 5 miles from its head. The shores are steep and high, with precipitous slopes very thickly wooded. There is a group of small, and another of large islands, in the middle of the outside entrance to the bay, the Chiswell and Harbor Islands, respectively. There are also numerous small islands along both shores, which are thickly wooded, high and steep in general. There are three prominent large glaciers towards the head of the bay, all of which come down to the high water mark and are more or less active. The large glacier at the head of Holgate Arm discharges large quantities of ice during the summer months, which at times makes the Arm difficult to navigate. Pederson glacier on the west side of the bay is large, but not very active, extending back into the mountains to the westward for considerable distance. It is just to southward of the sand

bar, and comes down to the high water mark. Aialik glacier at the extreme head of the bay is the largest and most active. It discharges large masses of ice throughout the summer months, and at times fills the entire head of the bay with ice, above the sand-bar. The anchorages are few and not extra good on account of the great depths, and are subject to heavy williwaws. Cape Aialik is a low, sloping headland, and there are several bare rocks off it, the farthest about 1/8 mile. Rocks about 25 feet high lie off the cape in a southeasterly direction, and in line with the outermost one, which is just bare at high water. From off shore, the cape shows a gradual wooded slope rising back to higher peaks to the north. About a mile NNE (mag.) from the cape is a small, high, rugged and wooded island, and still farther along in line with the cape and the east tangent of this island, is Pilot Rock, about 7/8 miles distant. Pilot Rock is a bare, rounded, rocky islet about 100 feet high, upon which is a U.S.C.&G.S. triangulation station.

(b) Outlying dangers and islands.

Seal Rocks, the southermost point in the approach to the bay, are a group of small rocky islets, four in number. The northermost and largest is about 240 feet high and has an arch through the middle. About 2 sq. miles of hydrography were done in the vicinity, but no dangers were found outlying them.

Depths ranging from 18 to 53 fathoms were obtained, the bottom appearing to be very uniform with 40 fathoms, with sandy and rocky bottom. The passages between the rocks were all sounded and found clear, giving from 18 to 40 fathoms rocky

bottom. The passage between Seal Rocks and Lone Rock is clear so far as known, and is frequently used by vessels between Resurrection Bay and the coast to the westward. The passage between Lone Rock and Mother Island is not clear, and is not recommended for navigation. The numerous and various passages between the Chiswell Islands, the Bee-Hive, the Hay-stack, Mother Island; are clear, with the exception of those dangers mentioned below under another heading. The tidal currents are noticeable among these islands, and vary in velocity from 3 to 4 miles, occurring with ebbing and flooding tides, especially after a storm outside and with heavy seas.

(c) Pilots.

There are no regular pilots, but some one familiar with the bay might at times be secured at Seward.

(d) Refuge. (also see Anchorages below.)

In case of stress of weather, the nearest shelter for ships passing by, without running up into the bay to one of the anchorages mentioned below, is the small bay formed by the northeastern ends of High and Middle Harbor Islands. This bay is clear as far as is known, altho it was not entirely sounded, time not allowing. The bay is almost a perfect rectangle in shape, with its north east face open as an entrance. There is a small foul passage

*Boys' work situated
to side. out. a gully
at anchor & there
are both protected & open
a few minutes further in 290*

at the south west side, which, however, can be navigated by small boats, the channel being between the small island in the center of the opening and the north west shore of the bay, or south east point of Middle Island. Vessels can anchor anywhere along close to shore, near the head of the bay, preferably at the south east corner, which is better protected from outside winds. Altho the entire north east side of the bay is open, the force of the wind is greatly broken by the east shore of Aialik Bay. It is very well sheltered from south west gales. The depths vary from 10 to 20 fathoms , within 500 meters of the shore on all sides near the head, with rocky and sandy bottom. Another shelter in case of bad weather , especially in south or northeast gales, is the bight in the western side of Mother Island , which is the first large island west of Chiswell and north of Lone Rock. This bight is well protected from all except south west winds, altho it is subject to big swells with a heavy sea outside. The bight is about a half mile deep and a half mile wide and is clear as far as is known. The anchorage is in the middle, about 400 to 500 meters from its head, in 10 to 20 fathoms, rocky bottom. The above two anchorages are not recommended except as refuge in case of stress of weather, for ships passing by the bay. In extreme cases of danger, about the only place to beach a ship would be on the sand bar, near the

For small pulling
boats only

Low small rocks
in heavy weather
offer a lee for small
boats only. W.S.A.

head of the bay, or possibly on the gravel beach in Camp Cove or on the sandy beach in the small bay just above ~~Hook Bay~~ Hook Bay.

(e) Currents.

The currents are all tidal, and as far as known, are not very strong or dangerous at any place in the bay. The strongest tidal currents encountered were among the small islands lying north of Chiswell Island, especially between the Bee-Hive and the Hay-stack, where with ebb or flood tides, after a south west gale, the currents have a velocity of 3 to 4 miles, in a southwest direction between the islands. The passage between Harbor Island and Middle Harbor Is, has a fairly strong tidal current, especially with ebbing tide, having a velocity of from 3 to 4 miles, southwest thru the pass. Tide rips are frequently seen at various places among these outer islands, but are not strong or dangerous. A fair tidal current and tide rips often occur at certain stages of the tide, in the passage between the north end of N. Twin Is. and the mainland. Also at times a fairly strong tidal current runs out with ebb tide thru the pass between Chat Island and Cape Aialik. As a general rule, throughout the entire bay, flood does not run any length of time after high water or ebb after low water. All currents set fair with the channels and are not excessive or dangerous.

(f) Weather.

The prevailing winds during the summer are easterly

with rain, the gales during that time being from the same direction. The easterly winds are light in the forenoon and generally spring up stronger towards 3 P. M. As a general rule, the northerly glacial breezes from off the glaciers at the head of bay, spring up in the afternoon and blow strongly until sundown. The gales and storms, as stated above, are usually from the southeast, but occasionally a bad southwest storm occurs. Fresh northwesterly winds are apt to occur at any time during the summer; they are generally accompanied by rain and last from one to two days. The month of August 1912 was exceptionally wet, 23 days of rain and wind occurring in succession. As a general thing, a good deal of wet weather can be expected in this vicinity all during the summer and fall. Snowstorms may be expected from the first of October to the last of April. Fog and hazy weather may be expected occasionally during the summer, its duration without partially clearing is generally short, although spells of foggy weather may last several days. Ice very often closes the upper part of the bay to navigation, as well as in Holgate Arm, even in summer, and considerable masses of large cakes of floating ice are occasionally being carried by wind and tide down the bay and out to sea. The ice in the bay has an extremely blue color. The streams and small lakes are usually very full all summer, on account of the heavy rain fall.

(g) Landmarks.

There are numerous and prominent landmarks throughout the bay, likely to be useful to navigation and future surveys. On entering the bay between Cape Aialik and the Harbor islands, a very prominent and conspicuous mark is the large, high split rock, in reality, two separate rocks which were originally one, that stands about 25 meters off the main shore of Chat Is; near the southwest end. It stands about 60 feet high and the extreme top of the outer rock was white-washed and used as a hydrographic signal during the survey of the bay, made in 1912. Another prominent landmark is the sharp, pointed and rugged islet, mainland at low water, upon whose top the triangulation station "Tooth" is located. To a vessel coming up the bay it appears like a huge tooth sticking up out of the water. It is on the east side of the bay, about three quarters of the way up, and stands about 150 feet high. It is just across the bay from Holgate Arm and is about 3 1/2 miles south of the sand bar that extends across the bay. On the west side of the bay, at the north entrance to Camp Cove, is a very sharp, pointed, conical shaped rock, projecting up out of water, about 15 meters off the main shore. It stands about 12 feet high above high water and was also used as a hydrographic signal during the survey, its top

being white-washed, which makes it very conspicuous for several miles, and can be seen very clearly from across the bay. About 1/4 mile off this pinnacle rock, bearing N. E. X E. 1/4 E. (mag.) from it, is a group of dangerous rocks, invisible at high water, which are described below. The above landmark should not be approached nearer than 1/2 mile. At the south entrance to Camp Cove is a very prominent, wooded peak, conical and symmetrical in shape, about 800 feet high; just under this peak is a large wedged shaped rock standing on end among other smaller ones, on the beach. Its top was white-washed, and it, and the pinnacle rock across the cove, define the entrance to Camp Cove. There is a large prominent archway on the south end of N. Twin Is., that shows very plainly from almost any position not abeam of it, where it can not be distinguished. Another conspicuous landmark is the small rocky islet, lying about 5/8 mile N x W of the north end of N. Twin Is. It is about 60 feet high, and has a large arch through it, trees growing on the top. It is just about 1/4 mile south of a rocky point, which should be given a wide berth. Another rocky islet about 70 feet high, also with an archway through it, lies about 50 meters off the western shore of the bay, just south of Hook Bay. It should be given a wide berth also, as there are rocks in the vicinity. In coming out of the bay and passing between Harbor Is. and the Twin islands, it is advisable to keep the passage between the two Twin islands open,

*
bonnie at P. W.

C

as a range to avoid all outlying rocks off the west shore.

(h) Inshore dangers.

The first inshore danger or rock, after entering the bay, using the channel between Chat Is. and High Is., is a small group of rocks, lying about 100 meters off the north west shore of Chat Is. They are not dangerous to navigation, on account of their nearness to shore, as a vessel will not have reason to be near this shore on entering the bay. These rocks are bare at about one half tide, but do not show or break at high water, except in heavy seas. There are no other rocks lying off the east shore of the bay, until Bear Cove is passed. There is a bad group of rocks about 125 meters off a rounding point, forming the south entrance to a small rocky cove, the next north above Bear Cove. These rocks are visible at half tide and break except at high water with a smooth sea. This cove, as well as the next two above, are small and their shores are fringed with rocks, and altho are clear in the middle as far as known, are not recommended for large vessels to enter. Another off shore rock, which must be given a wide berth, lies just off the prominent landmark and triangulation station "Tooth". It is about 200 meters off shore, due west (mag.) of the rocky point. It is very seldom visible and then at extremely low spring tides. In a heavy sea at ordinary tides the water ripples and breaks a little over the rock. Entrance to Holgate Arm. This can be en-

tered at times, according to the amount of ice discharging from the glacier at its head, by steering a mid-channel course all the way up, keeping equally distant from both shores, which are almost continuously fringed with boulder reefs and rocks. There is a rocky reef that makes out from the point forming the north entrance to the Arm, and the farthest out least depth found on this reef was 8 fathoms, at a distance of $5/8$ mile, S. E. (mag) from the point, while depths of 3 to 7 fathoms were found at various places along this reef nearer the point and bearing E.S.E. (mag) from it, a 4 fathom spot lying over $1/4$ mile off. The next rocks, lying off the west shore of the bay, south of above, is the group off the prominent narrow point projecting out into the bay about midway between Camp Cove and Hook Bay. It appears to be a pinnacle rock under water, with gradual sloping sides extending over several 100 meters. The rock was only once seen bare during the entire summer, while the survey was being made, but it occasionally breaks at low water with a rough sea. The pinnacle is 800 meters off the above named point and bears N $7/8$ W (mag) from it. Another group of dangerous rocks are those lying about 525 meters off the sharp, conical, pinnacle rock mentioned above under "Landmarks", which was white-washed, and lies at the north entrance to Camp Cove. They bear about

II.

N.E.xE.(mag) from this white-washed pinnacle, and are bare at about half tide, but usually always break, except in very smooth seas and extremely high water. They extend over an area of about 20x50 meters. Another invisible rock which breaks occasionally in heavy weather at low water, is that off the north end of North Twin Is. It extends over a considerable area, part of the reef at least, the higher point of rock having a least depth of 6 feet over it. This rock is in Twin Is. passage, about in range with the north end of N. Twin Is. and a point of the mainland south west of it. It is about 325 meters off the latter point and bears N.E.xE. (mag) from it.

(h') Rocks and reefs in the vicinity of the outlying islands.

A very bad rock, at times bare, and lying in an important passageway or channel, with good water throughout, but made dangerous on account of this reef, is between the Bee-Hive and the small second detached rock, or islet, off the east point of High Island. This rock was searched for on several different occasions, before it was finally located. It very seldom breaks and is less rarely bare, except at extremely low water during spring tides. It extends over an area approximately 10x25 meters, and lies about 625 meters N.xW. 1/2 W (mag) from the north west point of the Bee-Hive. It is also 520 meters S 1/4 W (mag) from the extreme

The passage is narrow & the reef is prominent

04

point of the small islet off High Is. At ordinary low water there is no signs of any rock. At the time it was located, it was bare about 3 to 4 feet and had two pinnacles, about 10 meters apart in an east and west direction. The north point or end of Harbor Is. should not be approached too closely, as a reef or rocky shoal makes out from it in a $W 1/4 N$ (mag) direction, for a distance of 275 meters. A 14 fathom spot was found here, with a 4 fathom one nearer in to the point in the same line. A detached rocky reef makes out from the southern end of middle Harbor Is. for some 300 meters, but they are all either bare, awash or breaking. This point should be given a wide berth, however. ¶ There is a rock just awash at low waters, that lies off the Hay-stack, about 120 meters E.S.E. (mag.) of the south east end of the island. It is a single rock, and is bare only at extremely low tides, and only breaks in heavy seas at high water.

¶ Another sunken rock or pinnacle of a rocky ledge lies about 300 meters off the rocky point on the southeast end of Mother Is. It is exactly in range with the large, high, tomahawk shaped rock that lies about 1/2 mile off the rocky point of Mother Is. It is 500 meters off this "Tomahawk", and is only bare at extremely low tides and does not break except during heavy seas. It is probable that a rocky reef or ledge extends outward from this rocky point of Mother Is. to Lone Rock. Soundings were not taken to the south of this sunken

* This does not agree with note at pos. 7X which says rocks were just awash at 4.5 feet tide. Awash at 1/4 tide accepted as final notation. See Review H-5085.

rock, but 14 to 20 fathoms were found between the rock and Mother Is. Along this same range, "Tomahawk Rock", and point of Mother Is., is another rock showing but very little above high water, and about 1/4 mile north of Lone Rock. It was not located definitely. The passage between Lone Rock and Mother Is. is rocky and has not been sounded thoroughly on account of the very few number of favorable days that the party had during the season for this outside hydrography, and is therefore not recommended. All other rocks, as far as known, and not mentioned above, are plainly visible and stand high above the water, such as Lone Rock, the Tomahawk and the small rocky islets off the Chiswell Islands.

(i) Bars and Channels.

The bar near the head of the bay, extends entirely across from the east to west shore. It makes out from the east shore just at the point forming the north entrance to Coleman Bay. It is about 3/8 mile wide here and is bare at low water for a distance of about 1/4 mile from shore. It runs in a westerly direction and joins the western shore at a point about 1/2 mile north along the shore from Pedersen glacier. It is about 1/4 mile wide on this shore where a large, grassy, glacial flat extends down to meet it. The bar reaches across the bay, which at this

*see cuts of maps
when sounding*

point is about $1\frac{3}{4}$ miles wide and varies in width from $\frac{3}{8}$ mile at the eastern end to about 50 meters at the narrowest place. It breaks in a heavy sea for a distance of $\frac{3}{8}$ mile or so out from the eastern shore and also for a short distance out from the western side. The narrowest place is about $\frac{5}{8}$ mile east (mag.) from the rounding point of the glacial flat on the west shore, and at this point the deepest water on the bar is found, about 20 feet, above the datum used (Mean L.L.W.). A few hundred meters either side of this place the water is much shallower, the least depth found, more than $\frac{1}{2}$ mile from shore, being 13 feet, at a point just about $\frac{1}{2}$ mile off the eastern shore, bearing W.S.W. (mag) from a large old stump lying on the beach. Near the western shore, about $\frac{5}{8}$ mile off the beach, bearing about east (mag) from the point, the least depth is 12 feet. Inside these two limits the water is all deeper than the depths just given. The bottom is mostly sandy, but at places is rocky, which is the case at the deepest place over the bar, described above.

(i') Passages. 1. Dora Passage.

This name was given to the passage between Harbor Is. and Middle Harbor Is., or the narrow channel between the eastern point of the south end of Harbor Is. and the west side of the south end of Middle Harbor Is. The passage was found clear with a least depth of 4 fathoms, rocky bottom, in the

middle. An 8 fathom spot, rocky bottom, was found about 600 meters SxW (mag) off the rocky point of Middle Harbor Is., forming the entrance to the pass. This is the limit of the rocky reef that makes out from this point. The passage between Middle and High Is. is foul as already stated above. The passage between the small island off the southeast end of High Is. and High Is. can be navigated by a small boat. A line of soundings was carried through the middle of the pass, which at low water is about one foot bare. A line was also run between the east end of the small island and the long narrow "Slim" island east of it, giving a least depth of 10 fathoms in middle of passage. The narrow passage between the small, rocky islets, lying off the north end of High Is. is foul, but the pass between the north end of the island and the first small islet, off it, can be navigated by a small boat, the least depth in the middle being 16 fathoms. It is not the depth in this pass that limits the size of the boat, but its narrowness^s, which is less than 50 feet. The opening between Mother Is. and Cora Is. was sounded, giving least depths of 4 fathoms in the middle of the passage. 2. Chat Is. passages.

(Not including the main channel given below under sailing directions).

The safest channel to take, (see note above) for a large vessel is that between Chat Is. and Little Chat Is., lying

just to the eastward, about 1/8 mile off. The mid-channel gives clear passage, with a least depth of 20 fathoms in the middle. The passage between Little Chat Is. and the small, rocky islet east of it can also be navigated by a small boat, the least depth obtained in middle of channel, being 6 fathoms. Also the passage between the small, rocky islet and the point of the mainland is clear, giving 12 fathoms for the least depth in mid-channel. These channels are not recommended, however, except in day-light and calm weather.

3. Twin Is. Pass.

The mid-channel course, between Twin Is. and the mainland, gives good water, depths averaging about 50 fathoms. The channel between the north end of N. Twin Is. and the point of the mainland 1/2 mile across, is clear, but the north end of the island should not be approached nearer than 100 meters, as a rocky reef makes out from it. Also the sunken reef off the eastern point of the mainland must be given a wide berth. There is also good water in the pass between South and North Twin Is., altho the shores of both islands are fringed with rocks.

(j). Anchorages.

One of the best anchorages in the bay is in Paradise Bay, a small bight on the east side of the bay. No ocean swell makes into this cove and it is well protected from practically all winds. Occasionally a bad willawaw will blow

with a northerly wind. The cove is $1/2$ to $3/4$ mile wide and about $1\ 1/4$ miles long and clear. The anchorage is at the extreme eastern end, about 200 to 300 meters from its head, in 15 to 20 fathoms, muddy bottom. ¶ Another fair anchorage is the southeast bight or arm of Coleman Bay. A slight swell at times makes in here, and it is fairly well sheltered from all except westerly winds. Willawaws are bad at times in this cove, which is only about $1/4$ mile wide and $1/2$ mile deep, and is clear as far as known, altho it has not been thoroughly sounded, time not permitting. The anchorage is at the extreme head of cove, 200 to 250 meters from the south shore near a large water fall, in 15 to 20 fathoms, rocky bottom. There are several good anchorages towards the head of the bay, the other side of the sand bar, altho vessels using these, run the chance of encountering floating ice and strong glacial winds. About $3/4$ mile N.N.W. (mag) from the point on the east side of the bay, near where the sand bar begins, and which is bare at all stages of the tide, and about 250 meters from the beach, is a good anchorage, subject, however, to floating ice and glacial winds. It is practically just across the bar and to the south of a rocky point that makes out about $3/4$ mile beyond. It is only a shallow indentation in the shore line at this place, and the water varies from 8 to 16 fathoms with sandy bottom. On the west shore of the bay, a

good anchorage, especially for small craft, is in Hook Bay or McMullen's anchorage. For vessels not over 75 feet in length it is suitable, but is also a little difficult to enter. A sand spit makes out from the southeast shore off a small point for about 300 meters. Vessels should therefore enter the cove well up towards the northwest side, keeping about 100-150 meters off and steer S.W. x S. (mag) to a point about 300 meters from the head of the cove, then steer S.E. x E. (mag) into the hook shape end of the cove. This place is very rocky around the shore line, especially in the hook part, large single rocks extending out several hundred feet from the shore. The anchorage is well off shore, however, and affords plenty of swinging room for small craft. It is about midway between the two small projecting hooks or points of the cove, about 200 meters from each shore and 300 meters from the head of the hook. Depths are about uniform, 20 fathoms, with sticky and sandy bottom. This anchorage is not recommended except for small vessels, while for larger ships, a fairly good anchorage in the same cove, but not down into the hook of the bay, is about 1/4 mile off the sandy and gravelly beach on the east shore, in a W.S.W. direction, in 22-28 fathoms, sticky bottom. It is also a little less than 1/4 mile N.E. of the west shore and S.E. of the north shore. Another good anchorage is just off the

south end of Slate Is., which is clear and has depths varying from 10-20 fathoms, with muddy bottom. Camp Cove. This affords a good anchorage and is the most available, being nearer to the entrance of the bay, on the west side, just above N. Twin Is. At times, an ocean swell makes into the cove, and it is fairly well sheltered from all except easterly winds. The willawaws are bad with westerly winds. The cove is about 1/2 mile wide and 3/4 mile long and is clear. The anchorage is 200-300 meters from the head, about midway between the east and west shores, just N.E. of a large detached, rounded flat rock, just awash at very high water, but usually showing, and about 10 meters from a small rocky point on shore. The depths vary from 15-30 fathoms, with sticky bottom. There is a gravel beach on the southeast side of the cove, where water is available, landings easy, and an excellent camping site. A party of the U.S.S. McArthur camped here for 8 weeks.

(k). Landing places.

The landing places in the bay are very few, on account of the steepness and roughness of the shore line, and the heavy swells, which are often encountered along these shores. Landings are always easily made in most of the protected coves and bays, whose shores are not exposed to the swell from outside. Even here, where the rocky shores rise almost abruptly out of the water, difficulty will often be

encountered in climbing up over the rocks, which are usually covered with kelp, barnacles and other slippery substances. At low water landings are much easier made than at high water, as the outlying rocks which are bare, afford footing. Landings are readily made on the sandy or gravel beaches in Camp Cove, Hook Bay, at the head of the bay near the bar on both sides, and in numerous other small coves on either sides of the bay. Landings on the outside islands are difficult, except in calm weather and should then be made on the lee shores.

(l). Rivers.

There are no rivers or streams of any importance to navigation in the entire bay. Most of the streams are glacial and come in at the heads of the bays and coves. The waters of the bay, especially near its head, and after heavy rains, is somewhat discolored by glacial silt being washed into it from the glacial streams. The water is almost fresh at times, at the head of the bay, above the bar.

(m). Watering places for vessels.

There are numerous streams and springs along the shores of both sides of the bay, where water can always be obtained. The mountains and hills abound with large and small water-falls and the flats or low lands are usually covered with surface water, and can always be found at a little distance below the surface. In order for vessels

to obtain the water, however, they must land small boats ashore, and either fill them by hand, or run a pipe line or hose from the source of supply to them. It is doubtful whether the above would hold true during a dry season, probably it would not, and it might even be difficult to obtain water, except from the glacial streams at the head of the bay, which are always available for such, as long as there is ice above, and high enough temperatures to melt it. The nature of the land tends to make the surface-run-off very rapid and there is very little, if any, percolation into the ground.

(n). Lights, light-houses, buoys, beacons, etc.

As yet, none of the above have been established in this bay.

(o). Sailing directions for entering the bay.

1. East channel. On approaching the bay from the eastward, at a point 5 miles (nautical) $N 64 \frac{1}{2}^{\circ} E$ true (E.N.E. $\frac{1}{4}$ N. mag.) from Chiswell Is., (most northerly and easterly of group) and $6 \frac{1}{2}$ miles, 165° true (S.E. $\frac{1}{2}$ S.) from Pilot Rock, steer 302° true (W $\frac{1}{2}$ N) for $9 \frac{1}{2}$ miles, to a position (A) with north end of Harbor Is. on the port quarter, distant about $1 \frac{1}{2}$ miles. Then steer $353 \frac{1}{2}^{\circ}$ true (NNW $\frac{3}{4}$ W) for 9 miles, following the eastern shore at a distance of about 1 mile, which will bring the vessel to a position about $\frac{1}{2}$ mile south of the sand bar, which makes across the bay here, and about $\frac{3}{4}$ mile

*Both, in & distance by
Mr. Graham's aid. When
my penicillin on board ship was
one season, my + no independent
month. Let Q. Not checked*

off the west shore of the bay, which at this point is a large, grassy, glacial flat, extending back to Petersen Glacier. Up to this position of the vessel, if the above courses and distances were followed, deep water will be found the entire way, and at no place less than 100 fathoms, with sticky bottom. To cross the bar from this position, steer $29\ 1/2^\circ$ true (N $1/4$ E mag) for one mile. The bar will be crossed at exactly half way from the last position and the next one, or $1/2$ mile from each. The bottom at this point is rocky, while at most places on the bar, it is sandy. The least depth the vessel will pass over, if the bar is crossed at this point, is 20 feet. After steering the above course for a mile, change course, and steer true N. (NNW $1/4$ W) mag. for 3 miles, which will bring Squab Is. on the port beam, distant about $5/8$ mile. Beyond this point it is not advisable to go, at least for vessels of any size, on account of sunken rocks, ice-bergs and other dangers. A vessel is running considerable risk by going up the bay beyond a point $1/2$ mile or so south of the sand-bar, as beyond this, with the exception of along both shores for a distance of $1/2$ mile off, no soundings were taken, altho a mid-channel course might be steered with safety for some distance up past Slate Is., if no ice was encountered.

(2). To enter the bay from the westward. West-channel.

From a position 4 miles due west of Seal Rocks, and about 5 miles due south of Cape Wedge, steer 25° true (North) mag. for $5 \frac{1}{4}$ miles, to a position about midway between Lizzard Is. on the starboard beam and Cape Wedge on the port side. Then steer $3 \frac{1}{2}^{\circ}$ true (NNW $\frac{1}{8}$ N) for 7 miles to a position (A). off the north end of Harbor Is., which is the same position for changing course as given above in directions for entering by the eastern channel. This course is about mid-channel and passes between Harbor Is. and the Twin Islands, the depth after the first change in course being all over 100 fathoms with sticky bottom. The depths up to the change in course range from 40-60 fathoms.

(3). To enter Camp Cove.

From position (A), see above, steer 243° true (SW $\frac{3}{4}$ S) for a distance of 2 nautical miles, to a position, with the rocky point forming the south entrance to the cove, just $\frac{1}{4}$ mile on the port beam. Then steer $213 \frac{1}{2}^{\circ}$ true, (S $\frac{3}{4}$ W) for $\frac{1}{2}$ mile to the anchorage described above.

(4). To enter Paradise Bay.

From position A (see above) steer $32 \frac{1}{2}^{\circ}$ true (N $\frac{5}{8}$ E) for 3 miles to a position about midway in the entrance to the main part of the bay, with a very long, narrow, peninsular or point about $\frac{1}{2}$ mile on the starboard side and the shore on the port side about $\frac{3}{8}$ mile off. Then steer

107 $1/2^{\circ}$ true (E $3/4$ N) for 1 $1/2$ miles to the anchorage described above. In steering this last course, Paradise Bay is entered about mid-channel, and several white-washed rocks on prominent points are passed. After running just a little less than $1/2$ mile on this last course, the ship will pass between two prominent points, the one on the starboard beam being about $3/16$ mile off, and the point on the port beam about $3/8$ mile off. Two large white-washed rocks are lying on these points. About $3/8$ mile farther into the bay a prominent point is passed on the port beam, less than $1/4$ mile off, and a large rock on shore was white washed here during the survey. About $3/8$ mile still farther, another sharp point is passed on the starboard beam, about $1/4$ mile off. From here the best anchorage is a little over $1/4$ mile, altho a vessel can find good anchorage at almost any place in this bay.

(p). Ports.

There are no settlements in the bay, the nearest port being Seward, at the head of Resurrection Bay, about 20 miles north from Pilot Rock or Cape Aialik.

(q). Survey Methods.

The first few days of the hydrography were done before many signals had been erected or located, which necessitated using some poor position locations and running

some lines on range, where no signals could be seen. The hydrography in Dora Passage, between Harbor and Middle Harbor Islands, was done as well as possible without the necessary signals on the inside of the passage, and some poor fixes had to be taken, when other signals could not be seen, and some of the lines in this passage will be seen to have bends and crooks in them. Outside of the above exceptions, the hydrography in the bay was done very thoroughly, as far as the methods employed would allow, no wire drag work being done whatever. It is reliable and can be depended upon as far as it was done. The part of the bay above the bar, where the hydrography is incomplete, was not developed fully, time not permitting, as well as the little strip along close to shore, between Holgate Arm and Pedersen Glacier. The hydrography is controlled by triangulation and plane-table location of signals. There were 17 permanent marks established, 96 temporary marks, 41 semi-temporary marks and 18 natural ones in the bay, making a total of 172 stations. The permanent marks include all regulation U.S.C. & G.S. triangulation marks and copper bolts either leaded or cemented into the solid rock, while the temporary marks are drill holes and crosses cut into the solid rock, which are really more or less permanent also. Most of the above marked stations

should be recoverable for many years. The semi-temporary marks are those such as triangular notches and crosses cut into trees, with nails driven into them, and ^{other} such blazed marks. These should also last for considerable time, however. The natural marks include prominent and conspicuous pinnacle, shaped rocks, peaks, etc., which are also really permanent and can always be recovered.

An automatic tide guage, No. 82, was set up in Camp Cove, and installed about July 1, a framework having been built around projecting rocks in the south end of the cove. A plain staff was nailed to the framework for comparisons. Three well marked bench-marks were placed, which will be permanent, as they were all cemented into drill-holes in solid granite, along the shore near by, (For a description see the level record.) and the staff was connected at the beginning and end of the season. Tides were observed from July 1, to Sept. 20, 1912. Plane of reference was not determined by this party, but from the tidal records, together with those obtained at Seward, (Guage No. 93.) it was determined that high and low water at Camp Cove, occur at practically the same time as at Seward, while the rise and fall is just a little greater. Plane of reference used is mean lower low water.

Respectfully submitted,

Samuel A. Graham.

Aid, in charge.

The Coast Pilot div. should check Mr. Graham's courses & distances for sailing at water. Also acknowledge receipt of the mode for his book of experience in navigating. For winter's anchorage in Norway give to close within. S.A.G.

3421

C. & G. SURVEY,
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STATISTICS, AIALIK BAY, ALASKA.

1 - 40.000

Date	Letter	Vols	Angles	Sdgs	Miles	Vessel
July 26	a	: 1	: 47	: 23	: 6.1	Launch Delta..
" 27	b	: 1	: 178	: 150	: 17.0	" "
" 29	c	: 1	: 118	: 77	: 9.6	" "
" 30	d	: 1	: 118	: 83	: 10.2	" "
" 31	e	: 1	: 166	: 100	: 17.0	" "
August 1	f	: 1 & 2	: 155	: 100	: 17.7	" "
" 2	g	: 2	: 178	: 114	: 15.6	" "
" 3	h	: 2	: 56	: 56	: 5.0	" "
" 6	i	: 2	: 60	: 49	: 3.4	" "
" 13	k	: 2	: 192	: 144	: 11.3	" "
" 14	l	: 2	: 170	: 140	: 9.7	" "
" 21	m	: 3	: 46	: 33	: 3.6	" "
" 22	n	: 3	: 113	: 76	: 10.0	" "
" 23	o	: 3	: 178	: 124	: 14.5	" "
" 24	p	: 3	: 178	: 94	: 18.5	" "
" 26	q	: 3	: 212	: 148	: 17.0	" "
" 27	r	: 3 & 4	: 90	: 65	: 7.7	" "
" 29	s	: 4	: 190	: 122	: 14.5	" "
" 30	t	: 4	: 238	: 155	: 18.0	" "
" 31	u	: 4	: 191	: 132	: 16.0	" "
September 2	v	: 4 & 5	: 193	: 122	: 19.3	" "
" 3	w	: 5	: 170	: 124	: 18.5	" "
" 4	x	: 5	: 236	: 135	: 22.1	" "
" 6	y	: 5	: 60	: 57	: 4.0	" "
" 16	z	: 5	: 250	: 220	: 17.8	" "

3421

Number of

Date	Letter	Vols	Angles	Sdgs	Miles	Vessel
September 17	aa	6	174	130	16.0	Launch Delta.
" 18	bb	6	287	229	26.0	" "
" 19	cc	6	64	60	6.0	" "
" 20	dd	6 & 7	368	352	27.0	" "
" 21	ee	7	250	260	18.0	" "
<hr/>						
Total 30		7	6926	3674	417.1	Launch Delta
<hr/>						
July 26	A	1	10	5	3.0	Str. McArthur
August 21	B	1	38	36	3.5	" "
September 17	D	1	150	81	18.5	" "
" 18	E	1	256	169	31.0	" "
" 19	F	1	28	16	3.5	" "
" 20	G	1	234	228	29.0	" "
" 21	H	1	32	16	8.3	" "
<hr/>						
Total 7 days		1	748	551	96.8	" "

Recapitulation

Launch Delta	: 30 days:	7	: 6926	: 3674	: 417.1	:
Str. McArthur	: 7 "	1	: 748	: 551	: 96.8	:
Grand Total	: 37 "	8	: 7674	: 4225	: 513.9	:

APR 10, 1913.

HYDROGRAPHIC SHEET 3421.

Aialik Bay, Alaska, by Assistant C. G. Quillian
in 1912.

TIDES.

	Camp Cove ft.
Mean lower low water, or plane of reference on staff	6.5
Lowest tide observed " "	2.7
Highest " " " "	19.7
Mean range of tide	8.4

Coast and Geodetic Survey
APR 10 1913
TIDAL DIVISION

Department of Commerce and Labor

Hyd 3421

The hydrography of this sheet consists of a survey of Aialik Bay, Kenai Peninsula - Alaska.

Positions were plotted by the Field Party and have been accepted as correct. In some cases, however, where errors were suspected, the positions were checked, and where erroneous, either replotted or rejected.

The soundings were originally plotted in the field, but as no allowance was made for tide reduction, they were rejected and completely replotted.

Soundings book Vol. I page 16 locates a rock off Spear, which must have been erroneously recorded as Spear instead of Spike.

In a number of places the positions as determined by sextant readings fall inside the shoreline, in one case about 90 meters. On the most conspicuous cases attention is called by means of a "note" put in pencil, on the sheet. In one case, that of "Mother Island", the shoreline has been changed, and made to agree with the sketch given in the soundings book, Vol. I page 37, as per instructions received from the Chief Draftsman.

In numerous cases, all along the shoreline, there are groups of dangerous rocks; the regions surrounding

Department of Commerce and Labor

These have been fairly well sounded and the least depths recorded.

The depths in mid channel are great, and there are no apparent dangers.

In the northern part of the bay, about 5 miles from the head there is a sand bar extending across the bay, which was fully developed by the party.

With the exception of the part of the bay above the sand bar, and a few strips along the shore, the development of the bay is quite complete.

A sufficient number of triangulation stations and temporary marks to control the hydrography, have been established by the party, and the work, in general, has been systematically arranged and well executed.

J. B. Shklearin

May 1st - 1913